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EXAMINER	
TRAN, KHANH C	

ART UNIT	PAPER NUMBER
2631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/035,039	CLASSON ET AL.	
	Examiner	Art Unit	
	Khanh Tran	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *28-38* is/are allowed.

6)☒ Claim(s) *1-12,16,18,19,21-24, and 27* is/are rejected.

7)☒ Claim(s) *13-15,17,20,25 and 26* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/12/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: in line 3, *claim 10 should begin on the new line*. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 16, 18, 21, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamalainen et al. U.S. Patent 6,289,217 B1.

Regarding claim 1, Hamalainen invention is directed to a radio connection adapted to an environment changing over the connection in a cellular radio system where the radio traffic between the base station and the mobile stations is arranged on a multiple access principle. Figure 3 illustrates a retransmission as part of a method according to Hamalainen invention.

Referring to figure 3, in column 9 lines 10-45, for transmission, the source data is according to mode 301 subjected to channel coding and interleaving so that a given data sequence is interleaved for the duration of a relatively short period (usually 2-8

bursts, 4 bursts shown in figure 3). The foregoing step corresponds to the claimed step of providing data to be transmitted.

The transmission of bursts is represented by modes 302, 303, 304 and 305. The receiving device tries, in modes 306, 307, 308, and 309, to decode the data sequence after each received burst and sends, along with the acknowledgement, a message of the success or failing of the decoding for the transmitting device. The transmitting device sends the next burst connected to the data sequence if the receiving device has not correctly decoded the data sequence. Hence, the receiving device determines if the burst is correctly decodable. That step corresponds to the claimed step of "determining whether likely trustworthy channel quality data is obtainable. In making the rejection, decodable burst is equated to the claimed likely trustworthy channel quality data.

If the receiving device does not successfully decode the burst, the transmitting device sends the next burst connected to the data sequence. In view of that, the foregoing step corresponds to the claimed step of "when likely trustworthy channel quality data is not obtainable, determine whether to transmit at least a portion of the data pursuant to a first transmission selection mode".

Referring to figure 1, when all bursts belonging to one interleaving period are received, as disclosed in figure 3, the receiver determines whether the value of the function Q describing the connection quality is higher than the threshold value Q_th, see column 5 lines 13-23. If the connection quality is higher than the threshold value, the size of data transmission capacity reserved for the radio connection in the frame structure is reduced, so that the transmitting device must decrease the coding rate,

change the coding type or increase the modulation order in order to make all data being transmitted to fit in the reserved capacity, see column 3 line 62 via column 4 line 16. AS result of that, if the connection quality is higher than the threshold value, likely trustworthy channel quality data is obtainable as appreciated by a person of average skill in the art. Hamalainen et al. does not expressly teach the claimed step of when likely trustworthy channel quality data is obtainable, at least attempting to obtain channel quality data. However, in real time mode, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the receiving device keep receiving channel quality data because the transmitting device continue transmit data (no pause) until a request for reducing the capacity reserved for the connection between the base station and the mobile station. The foregoing step corresponds to the claimed "at least attempting to obtain channel quality data when likely trustworthy channel quality data is obtainable"

As recited above, if the connection quality is higher than the threshold value, the size of data transmission capacity reserved for the radio connection in the frame structure is reduced, so that the transmitting device must decrease the coding rate, change the coding type or increase the modulation order in order to make all data being transmitted to fit in the reserved capacity. In light of the foregoing, using the channel quality data, the transmitting device selects a second transmission mode (e.g. by decreasing the coding rate, changing the coding type or increasing the modulation order) for transmitting data. Hence, the foregoing step corresponds to the claimed step

"whether channel quality data is obtained, using the channel quality data to determine how to transmit at least a portion of the data pursuant to a second transmission mode".

Regarding claim 2, as disclosed in column 2 line 66 via column 3 line 7, the connection quality includes data transmission rate, bit error ratio and fluctuations within minimum and maximum values. Hence, in real time mode, the bit error ratio would determine whether the channel quality data is likely accurate at a time when used as claimed in the instant application.

Regarding claim 3, in column 10 lines 20-32, Hamalainen discloses an example of applying higher order modulation method using QPSK. In QPSK modulation, the I and Q components are representative of subcarriers. Hence, using analogous argument of claim 2, in real time mode, the bit error ratio would determine whether the channel quality data is likely accurate at a time when used for each of subcarriers as claimed in the instant application.

Regarding claim 16, as recited in claim 1, if the connection quality is higher than the threshold value, the size of data transmission capacity reserved for the radio connection in the frame structure is reduced, so that the transmitting device must decrease the coding rate, change the coding type or increase the modulation order in order to make all data being transmitted to fit in the reserved capacity. In light of the foregoing, it would have been obvious for one of ordinary skill in the art that decreasing

the coding rate, changing the coding type corresponds to selection of a coding scheme from among a plurality of candidate coding scheme. Hamalainen et al. further teaches utilization one of higher order modulation schemes such as BPSK, QPSK, which corresponds to the claimed selection of a modulation scheme.

Regarding claim 18, claim 18 is rejected on the same ground as for claim 16 because of similar scope. The only difference between claim 16 and claim 18 is that the selection of a particular modulation and coding scheme is for the first transmission selection mode in claim 18.

Regarding claim 21, referring to figure 3, for each burst transmitted from the transmitting device, the receiving device response with a positive including channel quality data. The receiving device corresponds to the transmission target.

Regarding claim 27, as recited in claim 1, if the connection quality is higher than the threshold value, the size of data transmission capacity reserved for the radio connection in the frame structure is reduced, so that the transmitting device must decrease the coding rate, change the coding type or increase the modulation order in order to make all data being transmitted to fit in the reserved capacity. Hence, the step of the transmitting device decreasing the coding rate, changing the coding type would correspond to the claimed step of whether the transmitter use. In light of the foregoing, using the channel quality data, the transmitting device selects a second transmission

mode (e.g. by decreasing the coding rate, changing the coding type or increasing the modulation order) for transmitting data as receiving a request for reducing the capacity. Hence, the foregoing step corresponds to the claimed step "when to transmit at least a portion of the data pursuant to a second transmission mode".

3. Claims 4-12, 19, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamalainen et al. U.S. Patent 6,289,217 B1 as applied to claim 8 above, and further in view of Kapoor et al. U.S. Patent 6,795,424 B1.

Regarding claims 4 and 8, Hamalainen et al. does not expressly teaches the claimed step of "obtaining data that tends to reflect at least a channel coherence time attribute of the transmission target".

Kapoor et al. teachings are related to a method for interference suppression in OFDM systems. In column 2 line 49 via column 3 line 3, Kapoor et al. discusses a measure of the rate of change of the channel response with time is given by the Doppler spread. The receiver can track and estimate the channel frequency response with the use of pilot sub-symbols inserted in the sub-symbol streams of each bin of interest. As known in the art, pilot symbols are transmitted along with data for estimating channel frequency response, which is used to determine the quality of the radio link as taught by Hamalainen et al.. As result of that, it would have been obvious for one of ordinary skill in the art at the time the invention was made that Hamalainen et al. method for adapting to an environment changing over the connection in a cellular radio system can be modified to include the measure of the rate of change of the channel response with time

by the use of pilot subsymbols. The motivation for combining both teachings is that the estimated channel response is not only used for estimating channel frequency response to determine the radio link quality, but also can be used for power transmission adjustment, which are both taught in Hamalainen et al. method. Hence, the pilot sub-symbols are used to determine the claimed channel coherence time attribute of the transmission target, which is a measure how fast a channel changes.

Regarding claim 5, in addition to the rejection of claim 4, the obtained data based on the estimated channel frequency response is representative of a channel coherence time attribute of the receiving device, corresponding to the transmission target. As further taught in Hamalainen et al. invention, figure 5 illustrates the adjustment of transmission power as part of the method for adapting to an environment changing over the connection in a cellular radio system; see also column 12 lines 17-67. Adjustment of transmission power is related to geographic location of the receiving device as appreciated by one of ordinary skill in the art.

Regarding claim 6, referring to figure 3, in column 9 lines 30-35, Hamalainen teaches that the receiving device studies in mode 309 as to which of the bursts that is transmitted was poorest in quality and requests the transmitting device to retransmit the burst according to mode 310. In view of that, studying the bursts that is transmitted corresponds to the claimed "accessing previously acquired data". Hence, using analogous argument of claim 4, in real time mode, the channel quality data obtained is

representative of data that reflects how fast the channel quality changes over the connection includes studying the bursts that is transmitted.

Regarding claim 7, in column 9 lines 30-45, Hamalainen further teaches retransmission occurs as a result of unsuccessfully decoding all bursts. Hence, new data is acquired, corresponding to the claimed features.

Regarding claim 9, Hamalainen et al. does not teaches the claimed step of "obtaining data that tends to reflect a rate of change of channel characteristics as pertains to the transmission target includes receiving a single bit that comprises data".

Kapoor et al. teachings are related to a method for interference suppression in OFDM systems. In column 2 line 49 via column 3 line 3, Kapoor et al. discusses a measure of the rate of change of the channel response with time is given by the Doppler spread. The receiver can track and estimate the channel frequency response with the use of pilot sub-symbols inserted in the sub-symbol streams of each bin of interest. As known in the art, pilot symbols are transmitted along with data for estimating channel frequency response, which determines to the quality of the radio link as taught by Hamalainen et al.. As result of that it would have been obvious for one of ordinary skill in the art at the time the invention was made that Hamalainen et al. method for adapting to an environment changing over the connection in a cellular radio system can be modified to include the measure of the rate of change of the channel response with time by the use of pilot subsymbols. The motivation for combining both teachings is that the

estimated channel response is not only used for estimating channel frequency response to determine the radio link quality, but also can be used for power transmission adjustment, which are both taught in Hamalainen et al. method. Hence, the receiving device receives periodically pilot bit, which is representative of channel information data.

Regarding claim 10, as recited in claim 9, Kapoor et al. discusses a measure of the rate of change of the channel frequency response with time is given by the Doppler spread. Hence, the step includes the claimed step of obtaining data that tends to reflect a rate of change of frequency dimension channel characteristics. The channel frequency response corresponds to the channel frequency response.

Regarding claim 11,referring to column 2 line 49 via column 3 line 3, Kapoor et al. discusses estimation of the channel by time-frequency interpolation technique. As suggested of using time interpolation technique to estimate channel, it would have been obvious for one of ordinary skill in the art that the obtained data reflects a rate of change of time dimension channel characteristics.

Regarding claim 12, as recited in claim 9, pilot subsymbols contain information to calculate the channel coherence time attribute as claimed in the instant application.

Regarding claim 19, referring to in column 11 lines 22-50, in a preferred embodiment, both the base station and the mobile station measure the C/I ratio as well

as the bit error rate and frame error ratio, when necessary, averaging for the duration of several successive measurements. In connection with the connection setup, the transmitting device indicates which are the basic parameters (e.g. modulation scheme, coding scheme) to be first used in connection with the connection. In averaging for the duration of several successive measurements as suggest by Hamalainen et al., it would have been obvious for one of ordinary skill in the art at the time the invention was made that the averaging process would correspond to the average across a plurality of subbands.

Regarding claim 22, as recited in claim 9, the receiver can track and estimate the channel frequency response with the use of pilot sub-symbols inserted in the sub-symbol streams of each bin of interest. Hence, the pilot sub-symbols are equivalent to a fast sounding channel evaluation signal. In column 2 line 7 via column 3 line 3, Kapoor et al. discloses in fast fading channels, the receiver estimates the channel by utilization of time-frequency interpolation techniques.

Regarding claim 23, as discussed in Kapoor et al. invention, the receiver can track and estimate the channel frequency response for each bin with good accuracy. Hence, response from the receiver to the transmitter includes bin channel quality indicator information for each bin in the OFDM domain, corresponding to the claimed multi-carrier domain.

Regarding claim 24, as discussed in Kapoor et al. invention, the receiver can track and estimate the channel frequency response for each bin with good accuracy. Because the channel response is expressed in frequency domain, it would have been obvious for one of ordinary skill in the art that the response from the receiver includes the frequency domain channel quality data.

Allowable Subject Matter

4. Claims 13-15, 17, 20, 25-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. Claims 28-29 are allowed.

Regarding claim 28, said claim is allowed over the cited prior art of record because the prior art of record cannot teach or suggest the claimed uniquely distinct features "*when likely trustworthy channel quality data is not obtainable for a first given transmission target, selecting a first modulation and coding scheme as set forth in the claim*" and "*when likely trustworthy channel quality data is obtainable for a second given transmission target, access at least channel quality data as set forth in the claim*".

6. Claims 30-34 are allowed.

Regarding claim 30, said claim is allowed over the cited prior art of record because the prior art of record cannot teach or suggest the claimed uniquely distinct features "*determining that the data includes first data to be tranmitted to a first transmission target and a second data to be transmitted to a second transmission target*" and "*when likely trustworthy channel quality data is not obtainable for a particular transmission target ...*" and "*when likely trustworthy channel quality data is obtainable for a given transmission target ...*".

7. Claims 35-38 are allowed.

Regarding claim 38, said claim is allowed over the cited prior art of record because the prior art of record cannot teach or suggest the claimed uniquely distinct features "*transmitting a message that includes an indication of the channel coherence time status and an average channel quality indicator information across the multi-carrier channel*" and "*transmitting a message that includes an indication of the channel coherence time status and a channel quality indicator information for a plurality of the carriers that comprise the multi-carrier channel*".

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hall U.S. Patent 5,991,618 discloses "Method and System for Estimating a Communication Mode Quality in a Wireless Communications System.

Malmgren et al. U.S. Patent 6,807,154 discloses "Link And Radio Cell Adaptation In TDD Systems".

Billstrom U.S. Patent 5,983,101 discloses "Point to Multipoint Radio Access System.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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